Simultaneous Differentials (or *Corresponding Fluxions*) are *Limits of Equimultiples of Simultaneous and Decreasing Differences.*

As we have seen, Newton also made this definition in "Quadrature of Curves," essentially as Hamilton gathered it from the "Principia." Many better mathematicians than myself, or than Professor Huntington, have, in fact, examined this definition carefully, and have found it to be rigorous, simple, and of great generality.

The infinitesimal method of Leibniz is to be found essentially in Newton's first tract "De analysi per aequationen . . .," which Newton himself later rejected as illogical. A third method of explanation is that of Lagrange, which consists in assuming (for independent variables), $dx = \Delta x$, $dy = \Delta y$, and for a dependent variable z $dz =$ *principle part of* Δz, which Lagrange proposed to determine as *the terms of first degree in the expansion of* $z + \Delta z$ *in ascending powers of* Δx, Δy. Newton's dz is the same, if we put $dx = \Delta x$, $dy = \Delta y$. The adoption of the derivative method, led to devices to obtain the same significance of dz by derivatives, without assuming expansions in series. These involve various logical difficulties, especially when there are several independent variables. Also the differentials appear to change their values by changing the independent variables, whereas, Newton's method shows that for every equation between the variables, there exists (if differentiation be possible) a definite corresponding equation between their differentials, irrespective of the choice of independent variables.

Unquestionably, there has been a long continued propaganda, fostered at bottom to protect the claims of Leibniz, and aided by the inertia of established usage, to keep the methods of Newton in abeyance. Imagine, if the nationalities of these men had been reversed, the number of pamphlets that would have exploited the matter, and the number of textbooks in that method which would years ago have been published.

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CARBON DIOXIDE AND INCREASED CROP PRODUCTION

TO THE EDITOR OF SCIENCE: In 1912, at the International Congress of Chemists held in New York, Professor Ciamician, of the University of Bologna, presented a paper on the "Photochemistry of the Future," in which, among other things, the suggestion was made that crop production might be increased by increasing the concentration of carbon dioxide in the air. Of course, the idea underlying such a suggestion is that since the carbon dioxide of the air is a necessary constituent in the synthesis of carbohydrate by the plant, and since, furthermore, the percentage of the gas in the air is comparatively small, any increase in the amount of carbon dioxide may tend to increase the amount of carbohydrate produced.

That such is actually the case has been found by a number of German chemists, according to the Berlin correspondent of the *N. Y. Tribune* (April 4). Working in greenhouses attached to one of the large iron companies in Essen, and utilizing the carbon dioxide (freed from impurities) obtained from the blast furnaces, the yield of tomatoes was increased 175 per cent. and cucumbers 70 per cent. Further experiments in the open air, on plots around which punctured tubes were laid, and through the latter of which the carbon dioxide was sent, gave increases of 150 per cent. in the yield of spinach, 140 per cent. with tomatoes and 100 per cent. with barley.

BENJAMIN HARROW

STRUCTURAL BLUE IN SNOW

TO THE EDITOR OF SCIENCE: The recent blizzard began here with a heavy downpour of rain on the evening of March 5, which later turned into a glistening snow that was shattered by the furious wind and formed a crystalline-looking glittering coherent mass whose structure was maintained by the low temperature (about 20° F.).

When the sun finally came out on Saturday afternoon, I noticed that the shadows of the trees and the shadow masses of the distant snow, appeared unusually *blue*, and that the